

CLAIMS

We claim:

1. A system for forwarding packets, comprising:

5 a first node for creating requests having a plurality of filters for specifying packet forwarding criteria and for specifying values for said filters based on a packet to be forwarded; and

10 a second node coupled to said first node and to a plurality of ports, wherein said second node comprises at least one table having information for specifying which of said ports are to receive said packet based on said filter values, and wherein said second node determines which ports are to receive said packet based on said table information and said filter values.

15 2. The system of Claim 1, wherein said second node is further for determining whether there is sufficient memory for a packet on a port and for reserving said memory, if so.

20 3. The system of Claim 1, wherein said second node is further for sending a reply selected between the group consisting of: indicating to send said packet if at least one port is ready to receive said packet, indicating to send said packet if all ports that are to receive said packet are ready to receive said packet, indicating to wait a period of time before retrying said request if no port is ready to receive said packet, indicating to wait a period of time before retrying said request if at least one port that is to receive said packet is not

ready to receive said packet, and indicating to drop said packet if no port is to receive said packet.

4. The system of Claim 1, further comprising a third node coupled to said first node and to a plurality of ports and comprising at least one table comprising port masks and for determining which of said ports coupled to said third node are to receive said packet based on said filter values and information in said at least one table on said third node, said third node having a different number of ports than said second node and wherein said first node 10 does not specify in said request the ports that are to receive the packet coupled to said third node when sending requests to said second node and vice versa.

5. The system of Claim 4, wherein said port masks at said second node comprise a bit for each port coupled to said second node and said port masks at said third node comprise a bit for each port coupled to said third node, 15 wherein said port masks comprise a different number of bits for said second and third node.

6. The system of Claim 5, wherein said first node is further for creating said requests without factoring in the number of ports at said second node and said third node.

7. The system of Claim 1, wherein said system comprises a plurality of nodes having ports and coupled to said first node, said plurality of nodes for 25 determining which of said ports coupled to said plurality of nodes are to receive

said packet based on said filter values, and wherein said first node further comprises at least one table having information for specifying which of said plurality of nodes is to receive said packet based on said filter values.

5 8. The system of Claim 1, wherein said first node is further for creating said requests without specifying which port at said second node is to receive said packet.

9. A method of forwarding transmissions, comprising:
10 a) a first node creating a request having a plurality of filters for specifying forwarding criteria for a transmission;
b) said first node sending said request to a second node;
c) said second node determining which ports, if any, coupled to said second node are to receive said transmission by mapping said filters to
15 information for specifying which ports are to receive said transmission based on said criteria; and
d) forwarding said transmission to said port, if any.

10. The method of forwarding transmissions of Claim 9, wherein a)
20 comprises said first node setting an index in at least one of said plurality of filters to specify at least a portion of said forwarding criteria.

11. The method of Claim 10, wherein a) further comprises:
a1) said first node examining an incoming transmission to determine
25 said index.

12. The method of Claim 10, wherein c) comprises said second node indexing at least one table comprising said information with said index.
- 5 13. The method of forwarding transmissions of Claim 9, wherein a) comprises said first node setting indexes in more than one of said plurality of filters to specify said forwarding criteria.
14. The method of Claim 13, wherein c) comprises:
 - 10 c1) said second node indexing at least one table comprising said information with said indexes to determine a plurality of bit masks that define ports that are to receive said transmission for criteria associated with respective filters; and
 - 15 c2) performing a logical AND between said plurality of bit masks to determine the port or ports that are to receive said transmission.
15. The method of Claim 13, wherein said plurality of filters specify forwarding criteria based on information selected from the group consisting of: virtual local area network membership, transmission source port, trunk balancing, multicasting, unicasting, and protocols supported.

16. The method of Claim 9, wherein c) further comprises:

c1) said second node determining whether an output buffer has sufficient memory for said transmission to be sent on a first port of said plurality of ports; and

5 c2) reserving space in said buffer if there is sufficient space.

17. The method of Claim 9, further comprising:

before forwarding said transmission, said second node sending a reply to said first node, said reply indicating a response selected between the group 10 consisting of: indicating to send said transmission if buffer space is reserved in e), indicating to wait a period of time before retrying said request if no buffer space is reserved in e), and indicating to drop said transmission if no port is to receive said transmission.

15 18. The method of Claim 9, further comprising:

before forwarding said transmission, said second node sending a reply to said first node, said reply indicating a response selected between the group consisting of: indicating to send said transmission if at least one port is ready to receive said transmission, indicating to send said transmission if all ports that 20 are to receive said transmission are ready to receive said transmission, indicating to wait a period of time before retrying said request if no port is ready to receive said transmission, indicating to wait a period of time before retrying said request if at least one port that is to receive said transmission is not ready to receive said transmission, and indicating to drop said transmission if no port 25 is to receive said transmission.

19. A system for forwarding packets comprising a first and a second processor and at least one computer readable medium having stored thereon instructions, which when executed on said processors implement a method of forwarding packets, said method comprising:

- a) said first processor creating a request having a plurality of filters for specifying forwarding criteria for a packet;
- b) said first processor setting indexes in said plurality of filters to specify said forwarding criteria;
- 10 c) sending said request from said first processor to said second processor;
- d) said second processor determining which ports, if any, coupled to said second processor are to receive said packet by:
 - d1) indexing a plurality of tables defining which ports are to receive said packet based on said criteria to determine a plurality of port masks;
 - d2) combining said port masks to determine which ports, if any, are to receive said packet; and
- 15 e) forwarding said packet to said ports, if any.

20. The system of Claim 19, wherein b) of said method further comprises:

- b1) said first processor examining an incoming packet to determine said indexes.

21. The system of Claim 19, wherein d) of said method further comprises:
 - d3) said second processor determining whether an output buffer has sufficient memory for said packet to be sent on a first port of said plurality of ports; and
 - 5 d4) reserving space in said buffer if there is sufficient space.
22. The system of Claim 19, wherein d) of said method further comprises:
 - d3) said second processor determining whether output buffers associated with a plurality of ports that are to receive said packet based on d2) have sufficient memory for said packet to be sent; and
 - 10 d4) reserving space in said buffers that have sufficient space, if any.
23. The system of Claim 19, wherein d2) of said method comprises performing a logical AND of said plurality of port masks.
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24. A method of forwarding transmissions, comprising:
 - a) a first node creating a request having a plurality of filters for specifying forwarding criteria for a transmission;
 - b) said first node indexing at least one table with said filters to determine
 - 20 which of a plurality of nodes having ports coupled thereto are to receive said request, if any;
 - c) said first node sending said request to said nodes determined in b) if any;
 - d) said nodes, if any, receiving said request and determining which
 - 25 ports, if any, coupled to respective of said nodes are to receive said

transmission by mapping said filters to information for specifying which ports are to receive said transmission based on said criteria; and

e) forwarding said transmission to said ports, if any.

5 25. The method of Claim 24, wherein b) comprises performing a logical AND of the results of indexing said at least one table.

26. The method of Claim 24, wherein said first node is implemented as an application specific integrated circuit (ASIC).

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27. The method of Claim 24, wherein said plurality of nodes are implemented as application specific integrated circuits (ASICs).